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**REPLY COMMENTS OF TAS, LTD. ON THE CALIFORNIA AND
WESTERN ELECTRICITY SUPPLY OUTLOOK REPORT**

**Docket 04-IEP-1D, Statewide and Western Electricity Supply Outlook Hearing
TAS, Ltd.**

TAS, Ltd. (Turbine Air Systems) appreciates the opportunity to comment on the resource adequacy report issued by the California Energy Commission ("CEC") concerning resource adequacy requirements ("RAR") under consideration by the California Public Utilities Commission ("CPUC"). These comments address the document entitled "California and Western Electricity Supply Outlook Report". The comments are specific to a technology-based solution that is believed to provide immediate relief to Southern California's peak capacity operating reserve margin shortfall.

Southern California's Immediate Need for Peaking Capacity

Of the report's major findings, beyond 2005, if aging power plants retire and are not replaced, most of Southern California will be unable to maintain a 7% operating reserve margin even under normal temperature conditions. (p.4) To further exacerbate this situation, available surplus power in the Northwest is subject to transmission constraints (North-South Split) in serving Southern California, and in Southern California's other major region for imported power, incremental surplus power from the Southwest is limited due to continued explosive demand growth in this region. (p.4)

From a broader statewide perspective, the report further states that California's ability to maintain minimum required operating reserve margins over the next five years will be largely determined by its ability to: 1) reduce demand, 2) secure necessary resources to meet increased load due to population growth and economic expansion, and 3) to offset possible retirements of aging power plants, particularly in Southern California. (p.15)

The Energy Commission staff report, *Resource, Reliability and Environmental Concerns of Aging Power Plant Operations and Retirements* identified several power plants with a high risk of retirement if they do not secure contracts providing financial incentives for their continued operation. (p.15) The report additionally pointed out that nearly two-thirds of the plants identified as high risk are in Southern California.

Chapter 1 of the report concludes with the following summary paragraph:

"Resource adequacy in California through 2010 will be influenced to a large extent by the continued operation of power plants at risk of retiring due to lack of financial incentives. If these plants are retired and their capacity is not replaced by alternative resources, California will not be able to maintain minimum required operating reserve margins beyond 2006 during periods of very hot temperatures, and the CA ISO Southern Region

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will fall below minimum required operating reserve margins in 2006 during normal temperature conditions. (p.20)

Need for Remedy to Southern California Peak Capacity Shortfall

It is stated that the California Public Utilities Commission (CPUC) Resource Adequacy proceedings may identify additional resources to replace the capacity shortage created as the aging fleet retires. Yet the report at this stage of the resource adequacy process focuses more on macro demand and supply growth projections versus near term solutions to remedy immediate capacity concerns.

Given that the LSEs are now responsible for securing their own supply to serve their load, and given that the California generation market is in transition due to regulatory changes, IPP financial instability and market uncertainty, there are not sufficiently transparent market signals by which to drive investment in pure peak power generation capacity. The lack of market transparency and long term certainty, which results in greater risk, leads LSEs to making shorter term decisions / commitments in serving their load. And, it leads developers of power generation assets to adopt a more conservative investment stance as they manage their portfolio of power generation assets. To quote from the report:

“The more that LSEs rely on long-term horizons and long commitment terms, the more directly their individual resource adequacy needs will be translated into new capacity. The more LSEs rely on short-term horizons and short commitment terms, the more indirect the link between individual resource adequacy and power plant construction, since it must be processed through the merchant sector in aggregate”. (p.53)

Lack of Focus on Innovation/Technology to Support Peak Capacity Requirements

The report states that, “the California Public Utilities Commission (CPUC) Resource Adequacy proceedings may identify additional resources to replace the capacity shortage created as the aging fleet retires”. (p.19) The report then goes on to present in Table 2-4, “Summary of High Probability Generation Additions”, a listing of 4,106 MWs of potential new generation capacity. The report also lists net imports, Table 2-5, “Net Interchange Assumptions”. This table lists 12,921 MWs of potential net MWs gained by importing from neighboring regions. Table 2-6, “2005 Transmission Improvements” further lists net available MWs to be gained from transmission system improvements.

In no section of this report, does the resource adequacy assessment study address the potential favorable impact of gas turbine engine or power generation innovation, the introduction of new generation technologies, or the promotion of existing technologies that offer potential to extract incremental MW capacity from existing generation assets.



Need for Market Signals to Drive Peak Capacity Investment

Market signals are key to driving new capacity investment in a competitive market. In California, market participants rely on multiple signals to drive new plant construction, i.e., long term investment. Key sources of market signals are LSE Loading Orders, capacity Supply Forms, RFOs, LSE purchase patterns across the spot market, the RPS-eligible renewable market and non-renewable procurement.

Per our understanding of Loading Order guidelines:

“The CPU’s procurement guidelines have adopted the “loading order” recommended in the state’s Energy Action Plan. Essentially, this “loading order” requires that all cost effective energy efficiency and demand-side resources be procured before any generation resources. Next, generation resources are to be procured through open, all-source solicitations, in which renewable resources enjoy a rebuttable presumption. Renewable and non-renewable bids are ranked by each IOU’s least cost best-fit criteria.” (p.54)

Per our understanding of the Supply Form Process:

“The capacity Supply Forms were designed to generically identify the amount, timing, and type of resource additions the LSE would need to meet a 15% planning reserve margin under the assumed conditions of each scenario”. (p.64)

All of the above market signal mechanisms are key to segmenting and communicating load requirements, but they might not offer sufficient signaling to developers of power generation assets to justify the financial risk of investing in incremental generation. Specifically, as related to Southern California’s immediate peak capacity requirements, we believe there are not sufficient market signals (and incentives) to direct required investment in peak generation capacity – especially in a market characterized as high risk and still evolving.

As a case in point, the IPP Energy Merchants, which as an industry group largely suffer from below investment grade status, are not in a financial position to add new generation capacity without a means for collateralizing the investment. Currently, in the California market, there is not sufficient market signaling, or underlying market structure, to drive desired (in Southern California critical) investment.

Market Need for Incentives to drive Peak Power Capacity Investment

As the report clearly establishes, electricity use in California varies widely over the time of day and time of year. Per Figure 2-4, “Annual Pattern of Daily Peak Demand” (p.13), demand is most volatile during the summer. On a typical day, demand increases 60 percent from the midnight low to the afternoon high. Because air conditioning drives peak demand, California sees its greatest demand spikes during the summer months. On a hot day, this swing can be 85 – 90 percent.



In Figure 2-5, CA ISO 2004 Load Duration Curve (p.14), it is stated that net energy for load exceeded 40,000 MWs over 174 hours during 2004. The report further states that, “the generation system must be capable of adding or dropping from some facilities to accommodate the wide daily swings in demand, the high summer peaks, weather variability and economic growth cycles.

There is a solution.

A technology exists that offers immediate remedy to Southern California’s peak capacity requirements. This technology is called Turbine Inlet Cooling (TIC). “TIC enables power plant owners to “control the weather” of their plant – in effect – to create an artificial cold front on a hot day. This technology comes from the air conditioning industry and it helps maintain an ideal temperature for the gas turbine. The concept of mechanically chilling the inlet air was introduced in aeroderivative (LM) gas turbines in the mid 1980s. These early LM units had relatively steep power-to-temperature (lapse rate) curves, so the value proposition – increased MWs due to inlet treatment – was big enough to warrant the investment.”¹ TIC is also recognized for its ability to follow load. TIC systems, which are modularized, pre-engineered and pre-manufactured, are capable of rapid ramp up and down of chilled inlet air to vary the gas turbine’s output.

Just as the wholesale power industry has created what is known as the spot market, to accommodate variances in demand and risk tolerance, the industry also has the opportunity to create a “hot-day market”, to accommodate natural swings in the weather. In order to drive the deployment of new technologies, or simply incremental investment in existing plants, there must be clear market signals to investors that they will achieve a reasonable return. This is a fundamental issue currently impacting the California, as well as national power generation (Merchant Energy) market, in that there is not sufficient credit quality or financial incentive to fund new generation projects that are not backed by long-term contracts. This is a macro industry issue, which unfortunately impacts the California market more directly than the rest of the U.S., due to California’s immediate need for peak power generation capacity.

If California were to create a hot-day market, in which the LSEs could purchase hot-day MWs, we estimate that approximately 2,000 MWs of existing capacity could be made available to support peak demand. The inherent value of TIC is that it will restore a gas turbine to nameplate capacity, simply by chilling the inlet air, thereby creating an artificial cold front. In appreciating the economic value of this artificial cold front, it is important to understand the inherent flaw associated with gas turbines engines. The “flaw” is that as the weather gets hotter, gas turbine output declines. So just when you need more power from your asset, there is less power produced. Consequently, with the direct correlation between weather and gas turbine power generation output – hotter temperatures means less power – gas turbine rated capacity can decline anywhere from 10-40%, as based on the specific gas turbine engine.

California’s peak capacity solution is sitting in California today. These are untapped “hidden” MWs, that can be made available through the introduction of a simple, available, environmentally friendly and highly cost competitive (less than have the cost of new generation)



For Change, TurboMachinery International, March/April 2005

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technology. Turbine Inlet Cooling, as marketed by TAS, Ltd. is currently installed at 19 sites across the State of California. These sites are owned by a cross section of producers ranging from IPPs, to munis to IOUs. Despite past market success in generators recognizing the direct and inherent value offered from TIC installations, U.S. market demand declined as IPP financial investment wherewithal declined. The solution exists, but as an industry, we do not have the financial means to access it. This is why TAS believes that the governing and regulatory authorities of the state of California should take steps to create a market to drive peak capacity investment. The governing authorities have the capability to establish the market rules, almost like a spinning reserve, to ensure that affordable hot-day MWs are available -- on the hot days when they are most needed.

Closing

TAS Ltd. thanks the California Energy Commission for this opportunity to comment and to participate in the critical process of ascertaining resource adequacy for the California power market. If you have any questions, please do not hesitate to contact Peter Armstrong, Director of Marketing and Regulatory Affairs at parmstrong@tas.com.



From: "Armstrong, Peter" <parmstrong@tas.com>
To: <docket@energy.state.ca.us>
Date: 8/5/2005 2:32:30 PM
Subject: Reply Comments "California and Western Electricity Supply Outlook Report"

Dear Sir or Madame:

Please find attached TAS's reply comments.

<<TAS Resource Adequacy Comments.pdf>>

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